33258

26.2331
11.4000
26.2354

S/668/61/000/012/002/004
B102/B138

AUTHORS: Branover, G. G., Kirko, I. M., Liyelausis, O. A.

TITLE: Experimental study of the influence of a transverse magnetic field on the velocity distribution in a mercury flow

SOURCE: Akademiya nauk Latviyskoy SSR. Institut fiziki. Trudy, no. 12. 1961, 167 - 175

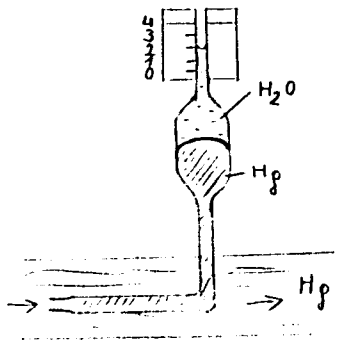
TEXT: The hydrodynamic effects in liquid metals in the presence of a transverse magnetic field were studied by means of an annular channel, shown in section in Fig. 2. Magnetic core and coil are designed to provide induction heating of the former up to 150°C when a 50-cps voltage of 380 v is connected. The channel is thus suitable for experiments with Hg and liquid Na. In the space for the actual channel, the H-field is relatively uniform, its radial and vertical variations are about 10% and only in about 1 cm of the upper part does H increase strongly. A solenoid current of 40 a induces a field of about 3000 oe. The mercury in the stationary channel was set in motion by a d-c pump. Two 15 cm long copper electrodes (bottom and top electrode) passed a current of up to 200 a

Card 1/

Experimental study of the ...

through the mercury in the channel, transverse to its direction of flow. The velocity distributions were measured for several Reynolds and Hartmann numbers (Re, M) and the coefficient of resistance (C_f) was determined.

A modified Pitot tube was used to measure the velocities; the velocity could be read from the scale, since $U = 13.6\sqrt{\Delta h_2}$ held.



h_2 is the increase in water level due to flow pressure. The velocity diagrams were drawn for M/Re values between $0.58 \cdot 10^{-3}$ and $4.1 \cdot 10^{-3}$ ($M = BR\sqrt{\sigma/\eta}$, B mean inductance in the channel, σ electrical conductivity of Hg). At low M/Re the diagrams were strongly dependent on the curvature of the channel. The unevenness of the velocities decreased with increasing magnetic induction, until constant velocity was established at $M/Re = (3\text{-}4) \cdot 10^{-3}$. The resistance coefficient $C_f = \tau_0/(\rho_1 U_0^2/2)$ (τ_0 - shear-

Card 2/4

Experimental study of the ...

ing stress at the wall, U_o - velocity at axis of flow, ρ_1 - Hg density) was determined between $M/Re = 0 - 4.4 \cdot 10^{-3}$. It was found to vary between ≈ 2 and ≈ 4 and can be assumed to be constant within the measuring error limits. There are 5 figures and 3 references; 1 Soviet and 2 non-Soviet. The reference to the Engli h-language publication reads as follows: W. Murgatroyd. Philosophical Magazine, 44, 1348, 1953.

Card 3/3

33259
S/668/61/000/012/003/004
B102/B138

26.2331
AUTHORS: Veze, A. K., Liyelausis, O. A., Mikel'son, A. E.

TITLE: Simulation of volumetric electromagnetic forces acting upon a conducting body in an electromagnetic field

SOURCE: Akademiya nauk Latviyskoy SSR. Institut fiziki. Trudy. no. 12. 1961, 191 - 198

TEXT: A special device (Fig. 1) was constructed in order to investigate the possibilities of simulating volumetric electromagnetic forces acting on a liquid in a pulsed magnetic field. Two chambers were mounted on the bottom of a tank completely filled with liquid metal. The pole pieces of the electromagnet were passed through the bottom of the tank from inside these chambers. The arrows show how the liquid moves when a current passes through the coil. Experiments were made with two different sized prototypes of this device and with Hg, Sn and Na as liquids. The motion of the liquid in the gap was determined in dependence on current strength and frequency. From the conductivity σ, density ρ, and permeability μ, characteristic dimension of the system d, circular frequency, ω, of the

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33259
S/668/61/000/012/003/004
B102/B138

Simulation of volumetric ...

supply current, ampere turns nI and gravity constant g. the following dimensionless quantities were defined: $\bar{\omega} = 4\pi\omega\mu\sigma d^2$, $\bar{I} = In\sigma\sqrt{\mu/\rho}$, $\bar{g} = 4\pi\sigma\mu d\sqrt{gd}$, and, as a quantity depending only on parameters of the metal: $\lambda = \rho/4\pi\mu\sigma\eta$. The relative velocity $R_M = 4\pi\sigma\mu vd$ is chosen as a non-determinative similarity principle. R_M as a function of $\bar{\omega}$, $\bar{g}$ and $\bar{I}$ characterizes the motion of the metal due to electromagnetic forces. In the case of $\bar{g}$-independent motion, R_M can be represented as a function of $\bar{\omega}$ when $\bar{I}$ is kept constant, or of $\bar{I}$ when $\bar{\omega}$ is kept constant. In both cases the values obtained for the three metals fit the same curve; in the last case it is a straight line. In simulating effects occurring in conducting bodies moving under the influence of a travelling magnetic field, skin-effect and the asynchronous nature of the electromagnetic forces have to be taken into account. This is done for the turbulent motion of the metal in a rotating magnetic field. If the induction $B \sim In/d$, $R'_M = 4\pi\sigma\mu v^2 d/(v_0 - v)$. v_0 is the field velocity in the system at rest. $R'_M(\bar{I}^2)$ is a straight line

Card 2/3

Simulation of volumetric ...

$R'_M = k\bar{I}^2$; for 50, 100 and 200 cps (ω = 0.4, 0.8, 1.6) the values obtained fit the same line. Due to the asynchronous nature of the forces, if $v_o \gg v$, a liquid may in some cases be simulated by a solid. The dependence of the criterion $\bar{N} = N\gamma\mu/114.3d^3B^2$ on $\bar{\omega}$ was also studied for Hg, and Al and Cu cylinders. (N is the moment of direction) All values again fit one curve. There are 5 figures and 5 Soviet references.

Card 3/3

FILIPPOV, M.V., kand. tekhn. nauk, otv. red.; KIRKO, I.M., doktor fiz.-mat. nauk, red.; BIRZVALK, Yu.A.[Birzvalks, J.], kand. tekhn. nauk, red.; LIELAUSIS, O.A.[Lielausis, O.], kand. fiz.-mat. nauk, red.; TSINOBER, A.B.[Cinobers, A.], red.; UKERMARKA, R.P., red.; SAVEL'YEVA, Ye., red.; TEYTEL'BAUM, A., red.; LEMBERGA, A., tekhn. red.

[Reports delivered at the Third Conference on Theoretical and Applied Magnetohydrodynamics in Riga, July 2-7, 1960] Doklady, prochitannye na... Riga, Izd-vo AN Latviiskoi SSR. Sec.3. [Problems in magnetohydrodynamics] Voprosy magnitnoi gidrodinamiki. 1963. 408 p. (MIRA 17:4)

1. Soveshchaniye po teoreticheskoy i prikladnoy magnitnoy gidrodinamike. 3d, Riga, 1962. 2. Chlen-korrespondent AN Latviyskoy SSR (for Kirko).

ACCESSION NR: AT4042282 S/0000/63/003/000/0059/0063

AUTHOR: Branover, G. G., Liyelauzis, O. A. (Candidate of physico-mathematical sciences)

TITLE: Characteristics of transverse magnetic field effects on turbulent flows of liquid metal at various Re numbers

SOURCE: Soveshchaniye po teoreticheskoy i prokladnoy magnitnoy gidrodinamike. 3d, Riga, 1962. Voproxy* magnitnoy gidrodinamiki (Problems in magnetic hydrodynamics); doklady* soveshchaniya, v. 3. Riga, Izd-vo AN LatSSR, 1963, 59-63

TOPIC TAGS: turbulent flow, liquid metal flow, transverse magnetic field, drag coefficient, Re boundary value, magnetic field effect, conducting fluid flow, Reynolds number, hydromagnetics

ABSTRACT: To supplement existing reports for the ranges Re_{cr} to 1200 and 7500 to 30,000, the authors measured the effects of a transverse magnetic field on drag coefficients for Re=1410 - 3460 (M=0 - 10) in a channel with walls of non-conducting material (0.1 x 4.0 cm; stabilization sector 6 cm, operating sector 9 cm). The results served to establish a boundary value of Re≈2500, below and above which λ_m decreases and increases,

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ACCESSION NR: AT4042282

respectively, and the conclusion is drawn that variations in drag coefficient, when a transverse magnetic field is applied, are always in the direction of its critical values outside the field. Formulas are given for calculating Re_{cr} for a plane-parallel flow in a transverse field and λ for $Re > 2500$. It is pointed out that the effects of a field must be considered in design calculations calling for $M^2/Re > 10^{-3}$ to 10^{-2}. Orig. art. has: 3 graphs and 5 equations.

ASSOCIATION: none

SUBMITTED: 04Dec63 ENCL: 00

SUB CODE: ME NO REF SOV: 004 OTHER: 004

Card 2/2

ACCESSION NR: AT4042293 S/0000/63/003/000/0161/0170

AUTHOR: Veze, A.K., Liyelausis, O.A., Petrovich, R.A., Ulmanis, L. Ya.

TITLE: The conductive layer in the travelling electromagnetic field of a one-way indicator

SOURCE: Soveshchaniye po teoreticheskoy i prikladnoy magnitnoy gidrodinamike. 3d, Riga, 1962. Voprosy* magnitnoy gidrodinamiki (Problems in magnetic hydrodynamics); doklady* soveshchaniya, v. 3. Riga, Izd-vo AN LatSSR, 1963, 161-170

TOPIC TAGS: electromagnetic field, inductance, one way inductor, travelling magnetic field, vector potential equation

ABSTRACT: The authors attempt a theoretical calculation of the electromagnetic forces acting on a conducting layer of infinite length. At a distance δ from an infinitely long and infinitely wide one-way inductor of a travelling magnetic field, there is an infinitely long and infinitely wide conducting layer, which moves with respect to the inductor at a velocity of $2\tau f(1 - 2)$ (See Figure 1 of the Enclosure), where τ is the polar division of the inductor, s is the slippage, and f is the frequency of the current supplying the inductor. The thickness of the conducting layer is b, the specific conductivity of layer II is σ, the

Card 1/4

ACCESSION NR: AT4042293

between the theoretical and experimental results. Orig. art. has: 2 tables, 5 figures and 17 formulas.

ASSOCIATION: none

SUBMITTED: 04Dec63 ENCL: 01 SUB CODE: EM

NO REF SOV: 002 OTHER: 000

Card 3/4

ENCLOSURE: 01

ACCESSION NR: AT4042293

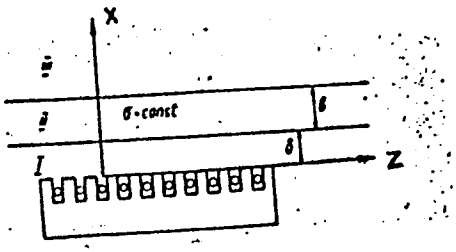

Fig. 1. Sketch for the theoretical calculation: I - region between inductor and conductor; II - conducting layer; III - space beyond conducting layer

Card 4/4

LIYELAUSIS, O. [Lielausis, O.]; TSINOBER, A. [Cinobers, A.];
SHTERN, A. [Sterns, A.]

Effect of a transverse magnetic field on the nature of the flow of liquid metal about bodies. Izv. AN Latv. SSR no.5: 73-76 '63. (MIRA 17:1)

ACCESSION NR: AT4042283 S/0000/63/003/000/0065/0076

AUTHOR: Branover, G.G., Kirko, I.M.(Corresponding member AN LatSSR, Doctor of physico-mathematical sciences); Liyelausis, O.A.(Candidate of physico-mathematical sciences); Tsinober, A. B.

TITLE: Hydraulics of free flows of liquid metal moving in channels with an inversely sloped bottom under the influence of a rotating magnetic field

SOURCE: Soveshchaniye po teoreticheskoy i prikladnoy magnitnoy gidrodinamike. 3d, Riga, 1962. Voprosy* magnitnoy gidrodinamiki (Problems in magnetic hydrodynamics); doklady* soveshchaniya, v. 3. Riga, Izd-vo AN LatSSR, 1963, 65-76

TOPIC TAGS: hydromagnetics, liquid metal free flow, ascending flow channel, rotating magnetic field, flow channel design, flow depth, flow rate, ascending flow equilibrium, streamlined ascending flow, turbulent ascending flow

ABSTRACT: The authors analyze the electromagnetic, gravitational, hydraulic drag and inertial forces acting on a sector of the length of free flow of a liquid metal ascending along the inversely sloped bottom of an open flow channel. After transformations, they evolve an equation for the dynamic equilibrium of such flows

$$\frac{dh}{ds} = \frac{\sin\alpha' - \frac{q^2}{K^2}}{1 - \frac{\alpha q^2}{gh^3}}. \qquad (1)$$

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ACCESSION NR: AT4042283

and find that it coincides for small flow depths with known hydraulic equations for the irregular motion of water in wide rectangular channels with a straight bottom gradient. A concept of critical flow depth, at which Fr=1.0, is illustrated and it is shown that the flow is streamlined at $h>h_{cr}$ and turbulent at $h<h_{cr}$. Experimental verification employed an organic glass channel (see Fig. 1 in the Enclosure), 100 cm long and 5 cm wide, and confirmed similarities to turbulent water flows. The effect of the magnetic field proved insignificant in view of $\frac{M^2}{Re} \approx 0.3 \cdot 10^{-3}$. It is concluded that the proper design of flow channels should preclude the occurrence of flow turbulence by providing for proper flow depth in addition to a proper rate of flow. Recommended calculation procedures are illustrated. Orig. art. has: 37 equations and 6 figures.

ASSOCIATION: none

ENCL: 01

SUBMITTED: 04Dec63

NO REF SOV: 002

OTHER: 000

SUB CODE: ME

Card 2/3

ENCLOSURE: 01

ACCESSION NR: AT4042283

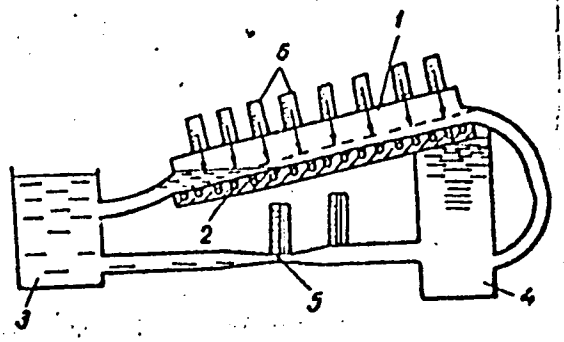

Fig. 1. Experimental verification unit: 1 - flow channel; 2 - rotating magnetic field inductor; 3 - liquid Hg tank; 4 - receiving tank; 5 - Venturi flow meter; 6 - flow depth indicators.

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L 27849-65 EWT(l)/EWP(m)/EPA(s)-2/EWT(m)/EPA(sp)-2/EPF(n)-2/EWG(v)/EWA(d)/EPR/EPA(w)-2/T-2/EWP(t)/EPA(bb)-2/EWP(b)/EWA(m)-2 Pd-1/Pab-10/Pe-5/Ps-4/Pt-10/Pi-4/Pu-4 IJP(c) JD/WW/JG S/0057/65/035/002/0235/0241

ACCESSION NR: AP5005223

AUTHOR: Branover, G.G.; Liyelausis, O.A.

TITLE: Some peculiarities of the influence of a transverse magnetic field on the turbulent flow of a liquid metal at various Reynolds numbers

SOURCE: Zhurnal tekhnicheskoy fiziki, v.35, no.2, 1965, 235-241

TOPIC TAGS: magnetohydrodynamics, mercury, Reynolds number, turbulent flow, velocity profile, magnetic field

ABSTRACT: The flow of mercury in a transverse magnetic field was investigated experimentally. The apparatus and methods of measurement are not discussed in detail because they have been previously described in several Latvian publications. The investigation was undertaken in part because of the contrary dependences of flow resistance on the magnetic field, found at low Reynolds numbers by Hartman and at high Reynolds numbers by Mergatroyd and by Brouillette and Lykodes. The intermediate range of Reynolds numbers was covered by the present experiments, and it was found that when Reynolds number was 2160 the flow resistance was independent of the magnetic field in the region of turbulent flow. In all cases laminar flow set

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L 27849-65

ACCESSION NR: AP5005223

in at the critical Reynolds number $250M^2\tanh M/(M-\tanh M)$, where M is Hartman's number and is proportional to the magnetic field. The difference between the magnetic field dependences of the flow resistance in turbulent flow at high and low Reynolds numbers is ascribed to the different relative importance of the Hartman effect (flattening of the velocity profile) and the magnetic suppression of turbulence in the two regions. The existence of the Hartman effect was verified directly by velocity profile measurements with a modified Pitot tube. The flow resistance was measured at Reynolds numbers from 6680 to 14,900 in smooth and rough channels, and it is concluded that the flow resistance is given with engineering accuracy by $L_o(1 + fM^2/R)$, where L_o is the flow resistance at zero field, R is Reynolds number, and f is 2 for smooth walls and of the order 10 for very rough walls. Experiments were also performed concerning the behavior of the flow in a channel of which the width changes suddenly, and these are discussed briefly. Orig.art.has: 10 formulas and 4 figures. [02]

Card 2/3

L 27849-65
ACCESSION NR: AP5005223

ASSOCIATION: Institut fiziki AN Latviyskoy SSR (Institute of Physics, AN Latvian SSR)

SUBMITTED: 13Mar64 ENCL: 00 SUB CODE: ME,EM

NR REF SOV: 006 OTHER: 014 ATD PRESS: 3193

Card 3/3

L 62215-65 EWT(1)/EWP(m)/EPA(s)-2/EWT(m)/EPA(sp)-2/EPF(n)-2/EWG(v)/EPR/EPA(w)-2/T-2/EWP(t)/EWP(b)/EWA(m)-2 Pd-1/Pe-5/Ps-4/Pt-7/Pi-4/Pu-4 IJP(c) JD/WW/JG

ACCESSION NR: AP5014184 UR/0382/65/000/001/0115/0122

538.4 : 669.163.1

AUTHOR: Branover, G. G.; Bugrov, N. S.; Kirko, I. M.; Liyelausis, O. A.; Molochnikov, M. V.

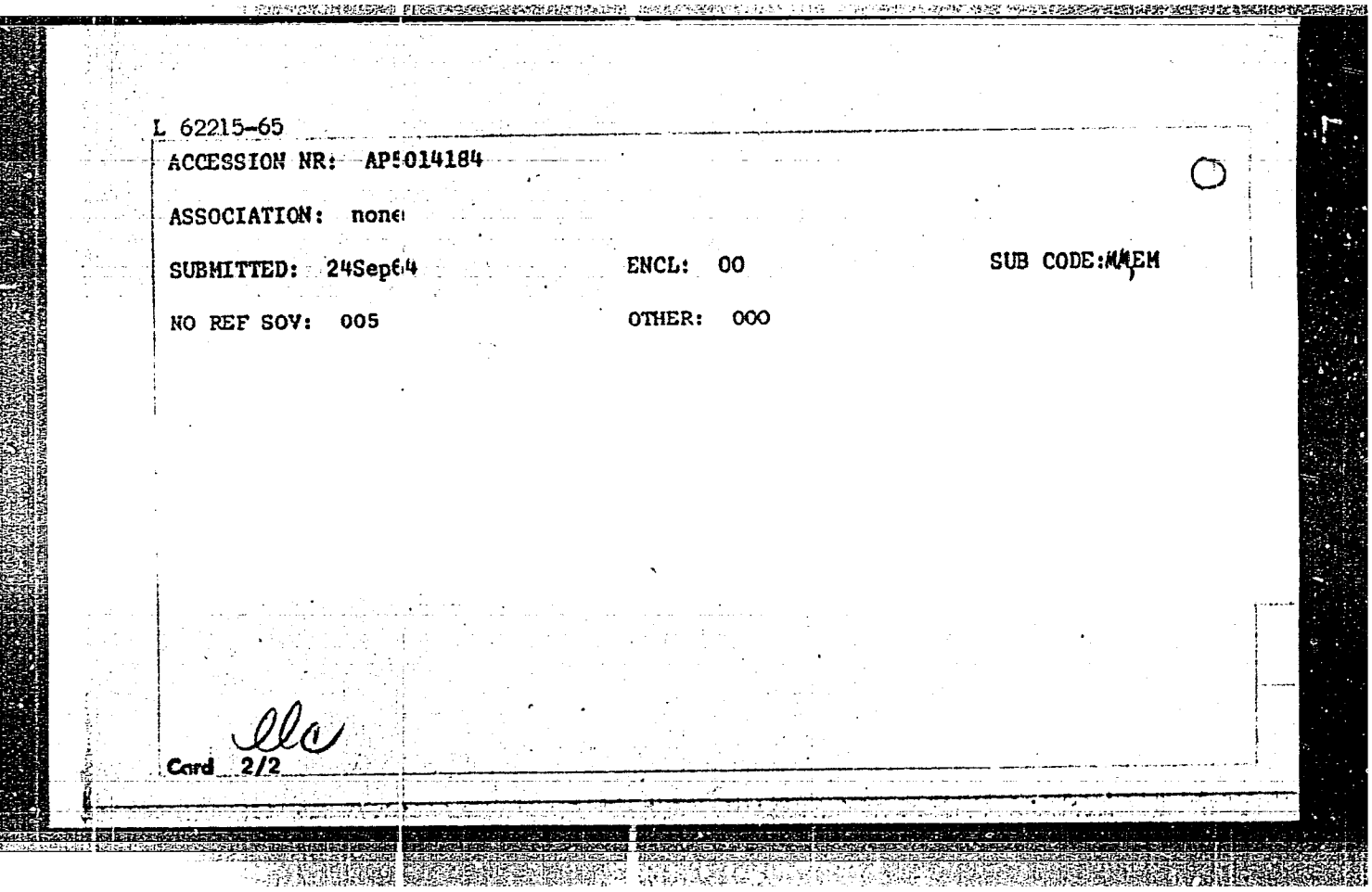
TITLE: Experiments with pressureless channel for molten iron

SOURCE: Magnitnaya gidrodinamika, no. 1, 1965, 115-122

TOPIC TAGS: liquid metal pump, magnetohydrodynamics, electromagnetic field

ABSTRACT: Liquid iron and steel flow in an electromagnetic field was studied. Special attention was given to flow rates and their dependance on the induction coil parameters. The test equipment is shown and described in detail. The upward flow of conducting metal is shown to begin approximately when electromagnetic and gravitational forces are equal. An empirical expression is given for the value of the magnetic field necessary for the start of the flow for a case of upward inclination of α degrees (ranging from 0° to 10°). Other experimental results are given including the energy loss as a function of the current in the inductor coils. Orig. art. has: 10 formulas, 5 figures.

Card 1/2



L 62215-65

ACCESSION NR: AP5014184

ASSOCIATION: none

SUBMITTED: 24Sep64 ENCL: 00 SUB CODE: MM,EM

NO REF SOV: 005 OTHER: 000

Card 2/2

L 16049-66 EWT(m)/EWP(t) JD/WW/JG

ACC NR: AP5027376 SOURCE CODE: UR/0371/65/000/005/0003/0014

AUTHOR: Branover, G. G. — Branovers, G.; Liyelausis, O. A. — Lielausis, O.; Tsinober, A. B. — Cinobers, A.; Shekhter, Ye Yu. — Sehters, J.

ORG: Physics Institute, AN Latv.SSR. (Institut fiziki AN Latv.SSR)

64
B

TITLE: Hydraulic theory of electromagnetic batcher

SOURCE: AN LatSSR. Izvestiya. Seriya fizicheskikh i tekhnicheskikh nauk, no. 5, 1965, 3-14

TOPIC TAGS: hydrodynamics, metal casting, electromagnetic effect, liquid metal, differential equation

ABSTRACT: The problem of liquid metal dosing occurs in connection with automatization of casting processes. The author suggests some new methods of batching based on mechanical displacement and pneumatic and electromagnetic effects

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L 16049-66

ACC NR: AP5027376

on metals. His methods are based on some known results in the hydrodynamics of an electromagnetic batcher. The author shows that nonstationary processes in the batcher can be satisfactorily described by means of differential equations corresponding to the various stages which comprise the entire cycle of dosing. These differential equations are solved stage by stage. If formulas of hydraulic duct-flow are used for expressing energy losses then the solutions of the corresponding differential equation can be carried to completion. These solutions are obtained within an approximation yielding the dependence $\theta = \theta$ (N) where is the time during which the N-th numbered dose is supplied by the pump of the batcher. Orig. art. has: 8 figures, 1 table and 20 formulas.

SUB CODE: 13,12/ SUBM DATE: 02Apr65/ ORIG REF: 011

Card 2/2

L 24162-66 EWT(m)/EPF(n)-2/EWP(t) IJP(c) JD/WW/JG
ACC NR: AP6015170 SOURCE CODE: UR/0382/65/000/001/0115/0122

AUTHOR: Branover, G. G.; Bugrov, N. S.; Kirko, I. M.; Liyelausis, O. A.; Molochnikov, M. V.

49
B

ORG: none

TITLE: Experiments on a pressure-free loop for liquid pig iron

SOURCE: Magnitnaya gidrodinamika, no. 1, 1965, 115-122 18 18

TOPIC TAGS: pig iron, molten metal, magnetic field

ABSTRACT: By means of experiments on a pressure-free loop for liquid pig iron, the approximate dependence of the capacity of the electromagnetic trough on the current load and the angle of rise have been determined. The required current loading has also been found for the start of transit flow. It was shown that the flux in the trough was steady. The loop consisted of a U-shaped channel connected to a bath of liquid metal. The metal moved along the loop under the action of a travelling magnetic field. Orig. art. has: 5 figures and 10 formulas. [JPRS]

SUB CODE: 13, 20 / SUBM DATE: 24Sep64 / ORIG REF: 005

2

Card 1/1 UDC: 538.4:669.163.1

L 26517-66 EWA(h)/EWT(1)/EWT(m)/ETC(m)-6/T WW/DJ

ACC NR: AP6011517 SOURCE CODE: UR/0382/66/000/001/0103/0108

AUTHOR: Branover, G. G.; Liyelausis, O. A.; Shekhter, Ye. Yu.

ORG: none

TITLE: Hydraulic principles of determining the parameters of liquid-metal metering devices with constant input pressure

SOURCE: Magnitnaya gidrodinamika, no. 1, 1966, 103-108

TOPIC TAGS: flow meter, liquid metal, flow measurement, liquid metal pump, mhd flow

ABSTRACT: The authors investigate non-stationary hydraulic processes occurring in a liquid-metal meter with electromagnetic induction pump at constant input pressure. The purpose of the investigation is to permit efficient design of such devices. The operation of the meter is divided into five states (filling of the working channel of the pump, raising the metal vertically, motion of the metal horizontally, flow of metal with the pump turned on, flow of metal by inertia after the pump is turned off). The differential equations of flow are written out for each of these stages, and analytic solutions are obtained for the last two stages of the flow. It is shown that by preparing a set of curves representing numerical solutions of these equations it becomes possible to choose the proper diameter of the metal pipe and the operating pressure, as well as to estimate the hydraulic resistance and other losses. Formulas which make it possible to estimate the structural parameters for known pump characteristics are also presented. Orig. art. has: 5 figures and 6 formulas.

SUB CODE: 20/ SUBM DATE: 03Jun65/ ORIG REF: 003

Card 1/1 UDC: 538.4

ACC NR: AP7005436 SOURCE CODE: UR/0382/66/000/002/0130/0134

BOGDANOV, Yu. V.; BRANOVER, G. G.; LIYELAUSIS, O. A.; LIYELPETER, YA. YA.; and TANANAYEV, A. V.

ORG: none

"Hydraulic Properties of Electromagnetic Pump Ducts; I"

Riga, Magnitnaya Gidrodinamika. (Magnetohydrodynamics), No. 2, 1966, pp 130-134

TOPIC TAGS: electromagnetic pump, friction coefficient, hydraulic resistance

Abstract: The flow pattern is studied and the coefficients of hydraulic friction of electromagnetic pump duct models are determined neglecting the effect of the magnetic field. The effect of the shape of the convergent and divergent parts of the electromagnetic pump duct on the coefficient of friction is estimated. The duct model investigated consists of a rectangular section with circular inlet and outlet sections tapering down to the rectangular duct.

Details of the experimental configuration and equipment are given. Results of measurements are presented in a table. Results of the flow pattern study will be presented in a future paper. The studies were carried out at the Hydroelectric and Hydroengineering Laboratory of the Kalinin-Leningrad Polytechnical Institute. Orig. art. has: 5 figures and 1 table. [JPRS: 38,764]

SUB CODE: 20 / SUBM DATE: 13Feb66

Card 1/1 UDC: 532.542.4:538.4

S/081/63/000/003/013/036
B144/B186

AUTHORS: Liyelbriyedis, I., Gudriniyetse, E.

TITLE: Sulfur derivatives of dibenzofuran

PERIODICAL: Referativnyy zhurnal. Khimiya, no. 3, 1963, 226-227, abstract 3Zh178 (Uch. zap. Rizhsk. politekhn. in-t, v. 6, 1962, 103-109)

TEXT: By sulfonating dibenzofuran (I) with dioxane sulfur trioxide (II) or concentrated H_2SO_4 + $(CH_3CO)_2O$ the 2-sulfoacid of I (III) is obtained, as well as its salts, anhydride and substituted amides. By sulfonating III with $ClSO_3H$ the dichloride of 2,8-disulfoacid of I (IV) is obtained, which is further converted into N-(β-hydroxyethyl)-amide of IV (V). 7.4g of II is added to 5 g of I dissolved in 20 ml $(ClCH_2)_2$, stirred till dissolution occurs, and after some hours III is filtered off, yield 4.8 g, m. p. 145 - 147°C (from water). A mixture of 10 ml $(ClCH_2)_2$, 10 ml $(CH_3CO)_2O$ and 1 ml conc. H_2SO_4 is added to 2.4 g of I dissolved in

Card 1/4

Sulfur derivatives of dibenzofuran

15 ml $(ClCH_2)_2$, after 2 hrs 1 ml concentrated HCl is poured in and III is obtained. By neutralizing the aqueous solution of III with soda or NaOH, the Na salt of III is obtained. An equimolar volume of aqueous solution of III is poured into 0.01 mole $C_6H_5NHNH_2$ dissolved in dilute HCl, and the phenyl hydrazine salt of III is filtered off, $C_{18}H_{17}N_2O_4S$, m. p. 193 - 195°C (from water). Compounds obtained analogously (here and below are given the compound, the gross formula and the m. p. in °C): α-naphthylamine salt of III, $C_{22}H_{17}NO_4S$, 267 (decomposition; from 50% alcohol); o-toluidine salt of III, $C_{19}H_{17}NO_4S$, 240 (decomposition, from alcohol); m-toluidine salt of III, $C_{19}H_{17}NO_4S$, 205 (from alcohol); aniline salt of III, $C_{18}H_{15}NO_4S$, 259 (decomposition; from alcohol). An aqueous solution of S-benzyl chloride is poured into a solution of III and the S-benzyl thiuronium salt of III is obtained, $C_{20}H_{18}N_2O_4S$, m. p. 191-193°C (from alcohol). The following were obtained analogously: p-nitro-phenyl diazonium salt of III, $C_{18}H_{11}N_3O_6S$, 143 - 144 (decomposition); m-nitro-

Sulfur derivatives of dibenzofuran

phenyl diazonium salt of III, $C_{18}H_{11}N_3O_6S$, 246 - 248 (decomposition). 0.27 g of III in 20 ml water is added to the aqueous solution of 0.13 g anthranilic acid (VI), boiled for 5 min, and the salt of VI and III is obtained, $C_{19}H_{17}NO_6S$, m. p. 222°C (decomposition). 7 g of III and 20 g PCl_5 are kept for 6 hrs at ~100°C, after cooling poured onto ice, and 6.3 g chloride of III is obtained, m. p. 137°C (from CH_3COOH or toluene). The mixture of 1.04 g chloride of III, 60 ml o-xylene, and 1.24 g ethanol amine are heated for 2 hrs, and N-(β-hydroxy ethyl)-amide of III is obtained, $C_{14}H_{13}NO_4S$ (VII), m. p. 164 - 166°C (from aqueous alcohol). This is dissolved in cold alcoholic solution of the base, and after some hours the Na salt of VII is obtained, $C_{14}H_{12}NNaO_4S$. The solution of the chloride of III and $C_6H_5NHNH_2$ in toluene is boiled for 5 min and phenyl hydrazide of III is obtained, $C_{18}H_{14}N_2O_3S$, m. p. 180 - 182°C (from alcohol). 10 ml $ClSO_3H$ is poured onto 5.6 g of III

Sulfur derivatives of dibenzofuran

dried at 110°C, after 48 hrs (20°C) ice is added, and 5.1 g of IV is filtered off, m. p. 219°C (from toluene). The mixture of 2.5 g of IV, 0.8 g ethanol amine and 150 ml o-xylene is heated for 5 hrs at ~100°C, the solvent is decanted from the oily substance which is dissolved in 10% NaOH, acidified with HCl acid, and V is obtained, $C_{16}H_{18}N_2O_7S$, m. p. 201 - 203°C (from water). [Abstracter's note: Complete translation.]

Card 4/4

LIYELDIYENS, R.

(3)

fuels

C.A. V-48
Jan 10, 1954
Fuels and
Carbonization
Products

Fractional distillation method in treatment of primary tars derived from sapropels. N. Brakšs and R. Lieldiens (Chem. Inst., Acad. Sci., Latv. S.S.R.). *Latvijas PSR Zinātņu Akad. Vēstis* 1950, No. 5(Whole No. 34), 23-34 (Russian summary, 34-5).—By fractional distn. of the tar from Latvian sapropels and by refining of the distillates with 15% NaOH and 10-20% H_2SO_4, the following yields were obtained, in per cent per tar: fraction up to 200°, 17-18; 200-270°, 16-18; above 270°, 22-29. To stabilize the products, further treatment with concd. H_2SO_4 was necessary. With 3% of concd. acid, 15-17% (per tar) gasoline, 15-17% kerosine (200-270°), 10-12% paraffin wax, and 16-17% neutral viscous oil were obtained.

A. Dravnieks

6-4-54

LIYELDIYENS, R. In Latvian

LIYELDIYENS, R. -- "Volumetric Determination of Small Amounts of Copper and Zinc." Latvian Agricultural Academy, 1952. In Latvian (Dissertation for the Degree of Candidate of Agricultural Sciences)

SO: Izvestiya Ak. Nauk Latviyskoy SSR, No. 9, Sept., 1955

KALNIN,K.[Kalnins,K.], dots., red.; LIELPETERS, P., red.; DARZINA,V., tekhn.red.

[Utilization of land on collective farms] Kolhozu zemes iericiba. Riga, Latvijas Valsts izdevnieciba, 1959. 255 p. [In Latvian] (MIRA 14:12)

(Latvia--Collective farms)

ODIN', Ya.[Odins,J.]; BUSH,K.[Buss,K.]; KLYAVIN', Ya. [Klavins,J.]; MAYKE,P.[Maike,P.]; GRUZIS,A., kand. sel'khoz.nauk, retsenzent; OZOLIN,K.[Ozolins,K.], inzh., lesokhoz., retsenzent; LIELPETERS,P., red.; KRASOVSKA, M., tekhn. red.

[Drainage of forests] Mezu nosusinasana. By J.Odins. and others. Riga, Latvijas Valsts izdevnieciba, 1960. 282 p. [In Latvian] (MIRA 14:12)

(Latvia--Forests and forestry) (Drainage)

LIYELPETER, Ya. Ya.

"Method for Designing Induction Pumps for Liquid Metal," from the book- (Applied Magnetohydrodynamics), Works of the Institute of Physics, Vol 8, edited by I.A. Tyutin, Candidate of Technical Sciences; I.M. Kirko, Candidate of Physicomathematical Sciences; V.G. Vitol, Candidate of Physicomathematical Sciences; and S.A. Varchenya; Riga, Publishing House of the Academy of Sciences Latvian SSR; 1956, 132 pp

Sum in 1467

LIYELPETERIS, YA. YA.

PHASE I BOOK EXPLOITATION SOV/3762

Konferentsiya po magnitnoy gidrodinamike. Riga, 1958.

Voprosy magnitnoy gidrodinamiki i dinamiki plazmy; trudy Konferentsii. (Problems in Magnetohydrodynamics and Plasma Dynamics; Transactions of a Conference) Riga, Izd-vo AN Latviyskoy SSR, 1959. 343 p. Errata slip inserted. 1,000 copies printed.

Sponsoring Agency: Akademiya nauk Latviyskoy SSR. Institut fiziki.

Editorial Board: D.A. Frank-Kamenetskiy, Doctor of Physics and Mathematics, Professor; A.I. Vol'dek, Doctor of Technical Sciences, Professor; I.M. Kirko, Doctor of Physics and Mathematics; V.Ya. Veldre, Candidate of Physics and Mathematics; V.G. Vitol, Candidate of Physics and Mathematics; Ya.M. Krumin'; and V.Ya. Kravchenko.

Ed.: A. Teytel'baum; Tech. Ed.: A. Klyavinya

PURPOSE: This book is intended for physicists working in the field of magnetohydrodynamics and plasma dynamics.

COVERAGE: This volume contains the transactions of a conference held in Riga, June 1958, on problems in applied and theoretical magnetohydrodynamics. The objects of the conference were the investigation of the basic trends in theoretical and applied magnetohydrodynamics, establishing contact between the people doing research in different branches of magnetohydrodynamics, and promoting the participation of theoretical physicists in problems in applied magnetohydrodynamics. More than 160 persons from different parts of the Soviet Union took part in the conference, and 55 papers were read. Similar conferences are to be held regularly in the future; the next such conference is scheduled to be held in Riga in June 1960. In this present collection of the transactions of the conference, most of the papers and comments on papers are presented by the authors themselves in an abridged form. The book is divided into two parts: the first part deals with problems in theoretical magnetohydrodynamics and plasma dynamics, and consists of 35 articles on such aspects of the problem as the application of magnetohydrodynamics in astrophysics (D.A. Frank-Kamenetskiy), magnetohydrodynamics and the investigation of cosmic-ray variations (L.I. Dorman), acceleration of plasma in a magnetic field (G.V. Gordeyev and E.I. Gubanov), stability of shock waves and magnetohydrodynamics (A.I. Akhiyezer). The second part, consisting of 33 articles, deals with problems of experimental magnetohydrodynamics, including the application of physical simulation for investigation of electromagnetic processes in liquid metals (I.M. Kirko) and the development of electromagnetic pumps (P.G. Kirillov), at the Institute of Physics of the Academy of Sciences, Latvian SSR. Several articles are devoted to induction pumps, electromagnetic crucibles, electromagnetic stirrers for molten metals, and their application in the metallurgical industry including schematic diagrams of their power-supply systems. References are given at the end of most of the articles.

Krumin', Ya.M. Comments on the Paper 252

Sevrin, L.S. Optimum Structural Utilization of Induction Pumps 253

Kirillov, P.G., Ya.Ya. Liyelpeteris, A.E. Mikel'son, and O.A. Gusev. Development of Electromagnetic Pumps at the Institute of Physics, Academy of Sciences, Latvian SSR 261

Tarchin, S.M. Comments on the Paper 269

Verte, L.A. Use of Induction Pumps in the Foundry and Metallurgical Processes 271

Vol'dek, A.I. Certain Problems in Designing Linear Induction Pumps 273

Verte, L.A. Comments on the Paper 277

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Card 11/12

LIYELPETER, Ya.

Heat processes in the electromagnetic induction pump. Vestis Latv ak no.9:91-100 '59. (EEAI 9:10)

1. Akademiya nauk Latviyskoy SSR, Institut fiziki.
(Electromagnetic pumps) (Heat)

LIYELPETER, YA. YA., CAND TECH SCI, ELECTROMAGNETIC AND HYDRODYNAMIC PROCESSES IN THE CHANNEL OF AN INDUCTION PUMP. [MOSCOW], 1960. (MIN OF HIGHER AND SEC SPEC ED RSFSR. MOSCOW ORDER OF LENIN [redacted] INST)! (KL, 2-61, 209).

ACCESSION NR: AT4042291 S/0000/63/003/000/0137/0152

AUTHOR: Bushman, A. K.; Veklenko, I. A.; Klyavin', Ya. Ya.; Liyelpeter, Ya. Ya.

TITLE: Design development of electromagnetic induction pumps at the Physics Institute of the Academy of Sciences of the Latvian SSR

SOURCE: Soveshchaniye po teoreticheskoy i prikladnoy magnitnoy gidrodinamike. 3d, Riga. 1962, Voprosy* magnitnoy gidrodinamiki (Problems in magnetic hydrodynamics); doklady* soveshchaniya, v. 3. Riga, Izd-vo AN LatSSR, 1963, 137-152

TOPIC TAGS: hydromagnetics, electromagnetic induction pump, cylindrical induction pump, spiral induction pump, straight line pump, liquid metal pump, induction pump design, induction pump cooling system, flow channel insulation, flow channel configuration, magnetic circuit design, pump IN-1, pump IN-4, pump IN-8, pump IN-9, pump IN-10, pump IN-11, pump IN-14, pump SIN-1, pump SIN-3

ABSTRACT: The report presents a brief survey of a number of designs developed at the Institut fiziki AN Latviyskoy SSR (Physics Institute of the Latvian Academy of Sciences) in recent years; specificiations and performance characteristics are tabulated. The designs included straight line, spiral and cylindrical electromagnetic induction pumps designed for the transfer of Na, Hg, NaK, Pb and InCa in the liquid state, operating at temperatures of 50 (Hg) to 650C (Na) and line free

Card 1/2

ACCESSION NR: AT4042291

quencies of 50 cycles/sec., and employing liquid or natural convection cooling systems. General discussion topics include the preselection of basic design characteristics in relation to the overriding operational requirements, the configuration and construction materials of channels, methods of mounting magnetic circuits, and the selection of cooling systems and heat insulating materials for the flow channel. Orig. art. has: 10 figures and 4 tables.

ASSOCIATION: Institut fiziki AN Latviyskoy SSR (Physics Institute, AN Latvian SSR)

SUBMITTED: 04Dec63 ENCL: 00

SUB CODE: ME NO REF SOV: 002 OTHER: 001

Card 2/2

L 34983-66 EWT(1)/EWP(m)/T-2 IJP(c)
ACC NR: AT6016815 SOURCE CODE: UR/0371/65/000/006/0027/0033

AUTHOR: Valdmanis, Ya. Ya. (Valdmanis, J.); Livelpeter, Ya. Ya. (Lielpetrs, J.); Mikel'son, Yu. Ya. (Mikelsons, J.)

ORG: Institute of Physics, AN LatSSR (Institut fiziki AN LatSSR)

TITLE: Effect of higher spatial field harmonics on the electrodynamic forces and Joule losses in a conducting strip moving in a traveling magnetic field

SOURCE: AN LatSSR. Izvestiya. Seriya fizicheskikh i tekhnicheskikh nauk, no. 6, 1965, 27-33

TOPIC TAGS: electrodynamics, magnetohydrodynamics, mhd generator, harmonic analysis, liquid metal, heat loss, magnetic field intensity

ABSTRACT: In view of the fact that in most papers devoted to the theory of magnetohydrodynamic induction machinery with liquid metal account is taken of only the fundamental harmonic of the magnetic field in the working gap, the authors analyze the influence of higher harmonics in an idealized model of a magnetohydrodynamic induction machine under the assumption that transverse and longitudinal edge effects can be neglected, and that the liquid metal moves as a rigid body. The ferromagnetic surfaces are assumed smooth, so that only higher harmonics due to the distribution of the winding conductors are taken into account. Under these assumptions, expressions are obtained for the force density and the Poynting vector of a conducting strip placed in the traveling magnetic field of a two-sided symmetrical inductor.

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L 34983-66
ACC NR: AP6016815

The calculations show that the dependence of the higher spatial harmonics on the various parameters of the system is quite complicated, and a detailed analysis of the effects is necessary. Although for certain configurations the Joule losses and the electrodynamic force may not be strongly affected by the spatial harmonics, in most cases these harmonics can exert a strong influence and result in appreciable changes. The effect of harmonics is stronger when the induction magnetohydrodynamic machine operates like a generator than when it operates in the pump mode. Orig. art. has: 5 figures and 36 formulas.

SUB CODE: 20, 09/ SUBM DATE: 20Mar65/ ORIG REF: 005

Card 2/2 BLG

L 8480-66 EWT(1)/EPF(n)-2/T-2/ETC(m) WW/DJ
(N)

ACC NR: AP5028530 SOURCE CODE: UR/0286/65/000/020/0124/0125

AUTHORS: Liyelpeter, Ya. Ya.; Okhremenko, N. M.

ORG: none

TITLE: A cylindrical induction pump. Class 59, No. 175824

SOURCE: Byulleten' izobreteniy i tovarnykh znakov, no. 20, 1965, 124-125

TOPIC TAGS: pump, induction pump, mechanical engineering

ABSTRACT: This Author Certificate presents a cylindrical induction pump consisting of an annular duct, a magnetic circuit, and a magneto with a three-phase winding (see Fig. 1). To increase the pressure efficiency, the duct of the pump carries longitudinal baffles made of an electrically conductive material.

Card 1/2 UDC: 621.689

L 8480-66
ACC NR: AP5028530

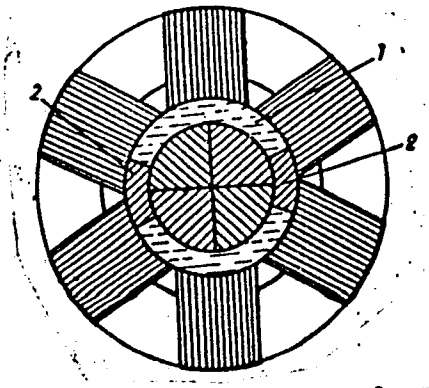

Fig. 1. 1 - Pump duct; 2 - longitudinal baffles.

Orig. art. has: 1 figure.

SUB CODE: 14, 13/ SUBM DATE: 26Sep64

leh
Card 2/2

ACC NR: AP7005436 SOURCE CODE: UR/0382/66/000/002/0130/0134

BOGDANOV, Yu. V.; BRANOVER, G. G.; LIYELAUSIS, O. A.; LIYELPETER, YA. YA.; and TANANAYEV, A. V.

ORG: none

"Hydraulic Properties of Electromagnetic Pump Ducts; I"

Riga, Magnitnaya Gidrodinamika. (Magnetohydrodynamics), No. 2, 1966, pp 130-134

TOPIC TAGS: electromagnetic pump, friction coefficient, hydraulic resistance

Abstract: The flow pattern is studied and the coefficients of hydraulic friction of electromagnetic pump duct models are determined neglecting the effect of the magnetic field. The effect of the shape of the convergent and divergent parts of the electromagnetic pump duct on the coefficient of friction is estimated. The duct model investigated consists of a rectangular section with circular inlet and outlet sections tapering down to the rectangular duct.

Details of the experimental configuration and equipment are given. Results of measurements are presented in a table. Results of the flow pattern study will be presented in a future paper. The studies were carried out at the Hydroelectric and Hydroengineering Laboratory of the Kalinin-Leningrad Polytechnical Institute. Orig. art. has: 5 figures and 1 table. [JPRS: 38,764]

SUB CODE: 20 / SUBM DATE: 13Feb66

Card 1/1 UDC: 532.542.4:538.4

ACC NR: AP6034584 (N) SOURCE CODE: UR/0382/66/000/003/0101/0105

AUTHOR: Valdmanis, Ya. Ya.; Liyelpeter, Ya. Ya.

ORG: none

TITLE: Theory of longitudinal edge effect in a linear induction magnetohydrodynamic machine

SOURCE: Magnitnaya gidrodinamika, no. 3, 1966, 101-105

TOPIC TAGS: MHD generator, mathematic model, magnetic field intensity, edge effect

ABSTRACT: Results of the theoretical and experimental determination of the structure of the magnetic field in the stator-rotor gap of a linear induction magnetohydrodynamic generator with an arbitrary number of magnetic poles are discussed. These results were obtained in order to compare the behavior of an experimental generator with an idealized mathematical model described in terms of magnetic intensity distribution in various regions of the generator. The solutions that were obtained are characterized by harmonic behavior. A special case of an unloaded generator is considered in greater detail for comparison with test generators of both the plane and cylindrical type. Measurements of the field distribution were made using magnetic loops as probes and some of the typical results are graphed for generators with magnetic conductor regions twice as long as the winding region. Similar results were found for generators with

UDC: 621.313.39:538.4

Card 1/2

ACC NR: AP6034584

conductor and winding regions of comparable length. The difference in field intensity for these two cases agrees qualitatively with the results of the mathematical model. Similar agreement was obtained in a test with a plane generator. Orig. art. has: 5 figures, 15 formulas.

SUB CODE: 20/ SUBM DATE: 28Jan66/ ORIG REF: 013/ OTH REF: 003

Card 2/2

ACC NR: AT7001352 SOURCE CODE: UR/0000/66/000/000/0005/0014

AUTHOR: Liyelpeter, Ya. Ya. (Candidate of technical sciences)

ORG: none

TITLE: Status of the theory of induction magnetohydrodynamic machinery with liquid-metal working medium

SOURCE: AN LatSSR. Institut fiziki. Dvizheniye provodyashchikh tel v magnitnom pole (Movement of conducting bodies in a magnetic field). Riga, Izd-vo Zinatne, 1966, 5-14

TOPIC TAGS: mhd, liquid metal pump, electric energy conversion, electromagnetism, hydrodynamics

ABSTRACT: This is a review article dealing with various applications of magneto-hydrodynamic (mhd) machinery, especially for uses other than pumping liquid-metal, such as conversion of heat energy into electricity, and other applications. Numerous references are made to published literature, and some topics which in the author's opinion are not fully covered in these publications are elaborated upon. The topics covered are induction pumps, the status of the electromagnetic theory of induction mhd machinery, the status of hydraulic theory of induction machinery, induction mhd machinery with plane and cylindrical geometry, and some studies of specialized and localized phenomena such as edge effects, structure of the liquid stream, and others.

SUB CODE: 13, 09/ SUBM DATE: 22Jul66/ ORIG REF: 070/ OTH REF: 006

Card 1/1

L 54907-65 EWT(d)/EPF(n)-2/EWP(1) Pc-4/Pq-4/Pg-4/Pc-4/Pk-4/Pl-4 IJP(c)

ACCESSION NR: AR5015068 UR/0044/65/000/005/B061/B061
519.3:51:62-50

SOURCE: Ref. zh. Matematika, Abs. 5B414

49
B

AUTHOR: Liyepa, A. P.

TITLE: Optimal control problem

CITED SOURCE: Izv. AN LatvSSR. Ser. fiz. i tekhn. n., no. 5, 1964, 43-48

TOPIC TAGS: optimal control, calculus of variations 16

TRANSLATION: Suppose the law of motion of an object has the form:

$$\dot{x} = f(x,u) \qquad (1)$$

where x is an n-vector, u is a controlling parameter whose values lie in the region V of r-dimensional space. The integrals

$$y^j = \int_{t_0}^{t_1} g^j(x, u)\,dt, \quad j = 1, \ldots, k; \ t_0, t_1 \text{ not fixed},$$

are given. In the space Y of the variables y^j a continuous function $\omega(y)$ is given, having the properties: 1) for each point $y_0 \in Y$ which is not a minimum point of the

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L 54907-65
ACCESSION NR: AR5015068

function ω, the set $F(y_0)$ of points $y \in Y$ for which $\omega(y) \leq \omega(Y_0)$ is locally convex; 2) the point y_0 lies on the boundary of the set $F(y_0)$. A definition is given of a locally convex set $F(y_0)$ (convexity is a stronger requirement). Conditions 1) and 2) are satisfied, as is shown in the work, if: a) $\omega(y)$ is nonnegative, the set $F(0)$ does not contain interior points, b) $\omega(\lambda y) = \lambda \omega(y)$ for all $\lambda \geq 0$; c) $\omega(y_1 + y_2) \leq \omega(y_1) + \omega(y_2)$. The problem is: in the phase space two points x_0 and x_1 are given. Among all controls $u \in V$ taking the point x_0 into the point x_1, find one for which $\omega(y)$ takes on the least possible value. Three theorems are given expressing necessary conditions for optimality in the given problem. It is shown that the maximum principle of L. S. Pontryagin is a particular case of these results. R. Gabasov

SUB CODE: MA ENCL: 00

Card 2/2

L 54908-65 EWT(d)/EPF(n)-2/EWP(1) Pc-4/Pq-4/Pg-4/Pu-4/Pk-4/Pl-4 IJP(c)
WW/EC
ACCESSION NR: AR5015069 UR/0044/65/000/005/B081/B081
519.3:51:62-50

SOURCE: Ref. zh. Matematika, Abs. 5B415

AUTHOR: Liyepa, A. P.

42
B

TITLE: Optimal control problems

CITED SOURCE: Izv. AN LatvSSR. Ser. fiz. i tekhn. n., no. 5, 1964, 49-53

TOPIC TAGS: optimal control

TRANSLATION: A problem analogous to the one investigated in another work by the author (ref. 5B414) is studied. In the present work the duration of a transition process is fixed. Necessary conditions are given for optimality in the problem of minimization of the norm of a finite state. Besides known conditions, there is a new necessary condition: $(\psi(t_1),\theta) \geq 0$, where $\psi(t_1)$ is a vector of the adjoint system at a given moment of time t_1, θ is any vector starting from a finite point $x_1 = x(t_1)$ and belonging to the interior of the set $\{x: \|x\| < \|x_1\|\}$. In the third part of the work necessary conditions are formulated for optimality in a problem

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L 54908-65

ACCESSION NR: AR5015069

with movable ends and non-fixed time. Optimality is determined in terms of the function $\omega(y)$.

SUB CODE: MA ENCL: 00

Card 2/2

Liepa, I. Zh.

USSR / General and Special Zoology. Insects P

Abs Jour: Ref Zhur-Biol., No 1, 1958, 2346

Author : I. Zh. Liepa
Inst :
Title : The Use of Aerosol Method of Control of Granary Pests in the Latvian SSR.

Orig Pub: Sb. tr. po zachshite rast. Riga, AN LatvSSR, 1956, 153-160

Abstract: The granary Curculionidae [Calandra granaria] was completely destroyed in 3 days and 3 nights by an aerosol of 4% GKhTsG solution in diesel fuel (DT) when the rate was 20-25 milliliters/cubic meter, and in 2 days and 2 nights when the rate was 35 milliliters/cubic meter. An aerosol of 20% solution of chloroten + DDT in DT acts slightly more effectively, at a rate of 20 milliliters/cubic meter, than an

Card 1/2

Ligga, U.E.

PHASE I BOOK EXPLOITATION SOV/6150

Akademiya nauk Latviyskoy SSR. Institut eksperimental'noy meditsiny.

Voprosy kurortologii. [t.] 5: Problemy fiziologicheskogo deystviya i terapevticheskogo primeneniya aeroionov (Problems in Health-Resort Therapy. v. 5: Studies of the Physiological Effect and Therapeutic Application of Air Ions). Riga, Izd-vo AN Latviyskoy SSR, 1959. 424 p. (Series: Its: Trudy, t. 20) Errata slip inserted. 1000 copies printed.

Sponsoring Agency: Akademiya nauk Latviyskoy SSR. Institut eksperimental'noy meditsiny.

Editorial Board: Resp. Ed.: L. L. Vasil'yev, Professor, P. D. Perli, Professor, F. G. Portnov, Candidate of Medical Sciences, Ya. Yu. Reynet, Candidate of Physical and Mathematical Sciences, and L.M. Tutkevich, Candidate of Medical Sciences; Ed.: A. Vengranovich; Tech. Ed.: A. Zhukovskaya.

Card 1/7

Problems in Health-Resort (Cont.) SOV/6150

PURPOSE: This book is intended for physicians working at health resorts and for the general practitioner.

COVERAGE: This book, a collection of articles, is essentially the proceedings of the Second Conference on the Physiological Effect and Therapeutic Application of Air Ions, held at Riga (Latvian SSR) in December 1957. The use of negative air ions is believed to be beneficial in the treatment of nonhealing wounds and ulcers which often result from radiation injury. The book contains photos of numerous devices described in the text. Numerous references, mostly Soviet, are given at the end of some of the articles.

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Zakke, I. F., O. Yu. Udris, I. F. Yaunkalns. Effect of Positive and Negative Air Ionization on the Cytology of the Blood and Connective Tissue of White Rats 221

LIYEPA, Yu., inzhener.

Improved gas reductors for gas cylinder automobiles. Avt.transp. 32 no.11:26-28 N '54. (MLRA 8:3)
(Automobiles--Engines (Compressed gas))

LIYEPA, Yu

BOGDANOV, G.; KOMOV, A.; LIEPA, Yu.

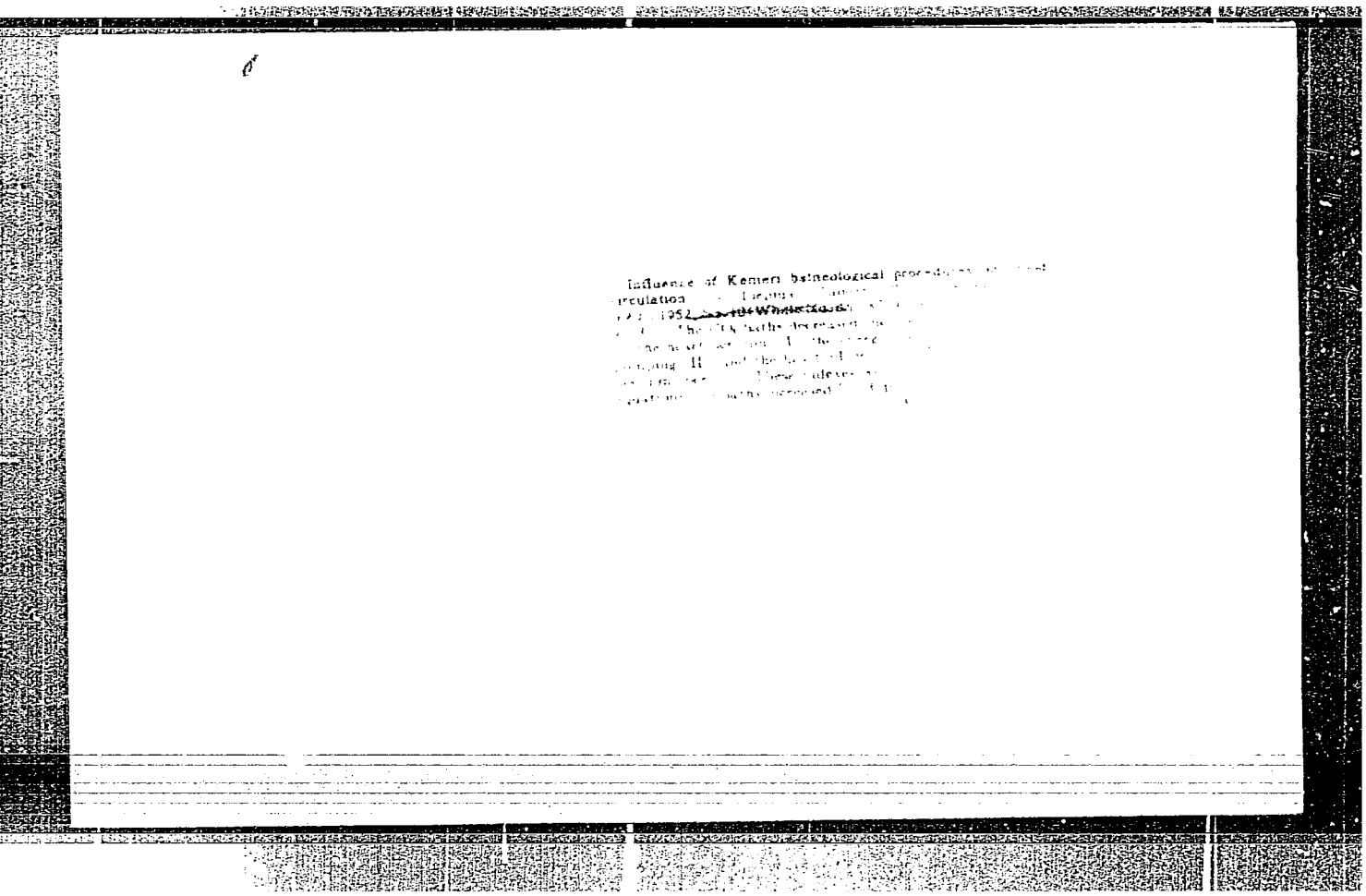
Shock absorbers of the "Moskvich-402" automobile. Avt. transp. 36 no.1:24-25 Ja '58. (MIRA 11:1)

1. Moskovskiy karbyuratornyy zavod.
(Automobiles--Shock absorbers)

LIYEPIN', G. P.

Liyepin', G. "On the effects of hydrogen sulfide chamber baths on the leucocyte picture of peripheral blood," Izvestiya akad. nauk Latv. SSR, 1948, 14, pp. 123-31--In Latvian language--Resume in Russian--Bibliog: 14 items

SO: U-3264, 10 April 1953, (Letopis 'Zhurnal 'nykh Statey, No. 3, 1949)



LIYEPIN, G. P.

LIYEPIN, G. P. — "Action of Kemeri Balneoprocedures on Blood Circulations." Acad Sci Latvian SSR, Inst of Experimental Medicine, 1953 (Dissertation for the Degree of Candidate of Medical Sciences)

SO: Izvestiya Ak. Nauk Latviyskoy SSR, No. 9, Sept., 1955

BIEZIN', A.P. [Biezins, A.], prof.; LISHNEVSKIY, S.M., prof.; PETUKHOVA, L.I., doktor med.nauk; LENTSBERG, K.Ya. [Lencbergs, K.], dotsent; SEGLIN', T.Ya. [Seglins, T.]; SKUDRA, A.Ya.; LIYEPIN', Kh. [Liepins, H.]

Posture disorders and scoliosis in children. Ortop., travm. i protez. 26 no.12:74-76 D '65.

(MIRA 19:1)

1. Iz Rizhskogo instituta travmatologii i ortopedii. Adres avtorov: Riga 5, ul. Duntes, d.16/22, Institut travmatologii i ortopedii. Submitted July 30, 1965.

SKULME, K.A., prof.; ?/NSONE, I.I. [illegible], L.; LIEPIN', Ya. [illegible]
[Liepins, J.]

Effect of smoked fish on the development of gastric cancer in man. Vop. pit. 24 no.1[illegible] Jan-Feb '65. (MIRA 18:9)

1. Laboratoriya pitaniya (zav. prof. K.A. Skulme) Latviyskogo instituta eksperimental'noy i klinicheskoy meditsiny AMN SSSR, Riga.

LIYEPINA, L. K.

see LEPIN', L. K.

LIYEPINS, K.

1. LIEPINS, K.; CEBERS, K.

2. USSR (600)

4. Agricultural Research - Latvia

7. Results of work carried out in the Michurin laboratories on collective farms of the Latvian S. S. R. during 1949 and 1950. Latv. PSR Zin Akad Vestis 3: 1951

9. Monthly List of Russian Accessions, Library of Congress, January, 1953. Unclassified.

USSR/Electronics - Receivers Jan 53

Amplifiers

"An Audio-Frequency Amplifier for a High-Quality Radio Receiver," K. Drozdov and A. Liyepin'sh, Riga

"Radio," No 1, pp 49-51

The amplifier described consists of four stages, ~~two~~. two resistance-coupled voltage amplifier stages, a phase shifter with a split load and a push-pull output stage. Negative feedback circuits are used. This af circuit used in the "Riga-10," a first-class receiver.

SOV/111-58-4-24/34

AUTHOR: Liyepin'sh, A.M., Senior Engineer of the Riga Long-Distance Telephone Exchange

TITLE: The Application of Semiconductors in the Equipment of Public Telephone Stations (Primeneniye poluprovodnikov v apparature peregovornykh punktov)

PERIODICAL: Vestnik svyazi, 1958, Nr 4, p 30 (USSR)

ABSTRACT: The author briefly describes a transistorized microphone amplifier for dynamic microphones "MD-41" or "MD-42", having a frequency range from 60 to 6,000 cycles. Figure 2 shows the circuit arrangement of this amplifier. Figure 4 shows the circuit arrangement of a transistorized telephone amplifier having a frequency range of 300-3,000 cycles. These devices were developed and manufactured in the laboratory of the Riga Long-Distance Telephone Exchange. There are 2 photos and 2 circuit diagrams.

ASSOCIATION: Rizhskaya mezhdugorodnaya telefonnaya stantsiya (The Riga Long-Distance Telephone Exchange)

1. Telephone communication systems--Equipment 2. Semiconductors --Performance

Card 1/1

LIYEPIN'SH, A.M. [Liepins, A.]

New devices aid in the use of equipment. Vest. sviazi 22 no.9: 13-14 S '62. (MIRA 15:9)

1. Nachal'nik proizvodstvennoy laboratorii Rizhskoy telegrafno-telefonnoy kontory.
(Telephone—Equipment and supplies)

KLEYNER, G. I.; LIYEPIN'SH, G. K.; L'VOVA, L. Ye.; NAGLE, A. M.

"Experiences of statistical analysis of the influence of fermentation conditions of griseofulvin production."

report submitted for Antibiotics Cong, Prague, 15-19 Jun 64.

Factory for Med Preparations, Riga, & Antibiotic Res Inst, Leningrad.

ARESHKINA, L.Ya.; BEKER, M.Ye.; BUKIN, V.N.; KARKLIN'SH, R.Ya. [Karklins, R.]; KLYUYEVA, N.M.; KUTSEVA, L.S.; LIYEPIN'SH, G.K. [Liepins, G.]

Microbiological synthesis of L-lysine. Prikl. biokhim. i mikrobiol. 1 no.4:396-403 Jl-Ag '65. (MIRA 18:11)

1. Institut biokhimii imeni A.N.Bakha AN SSSR, Institut mikrobiologii imeni A.Kirkhensteyna AN Latviyskoy SSR i Rizhskiy zavod biokhimicheskikh preparatov.

LIYEPIN'SH, P. P.

36633. Mikropaleontologicheskiye Issledovaniya Na Territorii Latviyskoy SSR. Izvestiya Akad. Nauk Latv. SSR, 1949, No. 10, c. 119-28- Na Latysh. Yaz. - Rezyume Na Rus. Yaz. - Bibliogr: 31 Nazv.

SO: Letopis' Zhurnal'nykh Statey, Vol. 50, Moskva, 1949

1. LIYEPIN'SH, P. P.

2. SSSR (600)

4. Geology, Stratigraphic-Baltic Region

7. Devonian profile in the Baltic region. Dokl. AN SSSR 87 No. 3, 1952

9. Monthly List of Russian Accessions, Library of Congress, February 1953. Unclassified.

Liyepin'sh, P.P.

USSR/Geology

Card 1/1 Pub. 22 - 33/45

Authors : Liyepin'sh, P. P.

Title : About Lower Devonian deposits in western part of east European platform

Periodical : Dok. AN SSSR 103/2, 295-298, Jul 11, 1955

Abstract : Geological-mineralogical data are given on the Lower Devonian deposits found along the east-European platform. Five references: 1 Pol. and 4 USSR (1933-1953).

Institution : .....

Presented by: Academician D. V. Nalivkin, February 1, 1955

DIKENSHTEYN, G.Kh., doktor geol-min.nauk; LEVINA, L.M.; LIYEPIN'SH, P.P.; MOKSYAKOVA, A.M.; PISTRAK, R.M.; SHEBUYEVA, I.N.; GENNAD'YEVA, I.M., tekhn.red.

[Geology, and oil and gas potentials of White Russia and the Baltic region] Geologicheskoe stroenie i perspektivy neftegazonosnosti Pribaltiki i Belorussii. Leningrad, Gos. nauchn.-tekhn.izd-vo neft.i gorno-toplivnoi lit-ry. Leningr.otd-nie, 1959. 178 p. (Moscow. Vsesoiuznyi nauchno-issledovatel'skii geologorazvedochnyi neftianoi institut. Trudy, no.18) (MIRA 13:2)

(White Russia--Petroleum geology)
(White Russia--Gas, Natural--Geology)
(Baltic Sea region--Petroleum geology)
(Baltic Sea region--Gas, Natural--Geology)

LIYEPIN'SH, P.[Liepins, P.] (Riga)

Specific way of the dislocation of stratification. Vestis Latv ak no.7:117-120 '60. (KEAI:10:9)

1. Akademiya nauk Latviyskoy SSR, Institut geologii i poleznykh iskopayemykh.

(Latvia--Geology)

LIYEPIN'SH, P. [Liepins, P.]

Jointing of Sub-Quaternary sediments in the Latvian S.S.R. Izv. AN Latv.SSR no.9:61-70 '63. (MIRA 16:12)

1. Institut geologii i poleznykh iskopayemykh AN Latviyskoy SSR.

LIYEPIN'SH, P. [Liepins, P.]

Unified subregional stratigraphic scale of the Devonian in the northwestern part of the Russian Platform. Izv.AN Latv.SSR no.1:21-26 '64. (MIRA 17:4)

1. Institut geologii v g. Riga Gosudarstvennogo geologicheskogo komiteta SSSR.

LIYEPIN'SH, P. [Liepins, P.]

New form of Camarotoechia of the Akmena series of the Famennian stage. Izv.AN Latv.SSR no.2:45-46 '64. (MIRA 17:4)

1. Institut geologii g. Rigi Gosgeolkoma SSSR.

LIEPINS, Janis; ROZENBERGA, R., red.

[How to eat] Ka est. Riga, Latvijas PSR Zinatnu akad. izd-ba, 1964. 52 p. [In Latvian] (MIRA 17:6)

[redacted], I. M.

"Characteristics of the Growth of Cereals When Bent Over." Cand Biol Sci, Moscow, State U, Moscow, 1953. (KhBiol, No 1, Dec 54)

SO: Sum 432, 29 Mar 55

LIYEPINYA, G. R

LIEPINYA, G. R.

USSR/Biology - Effects of Poisons on Plants 1 Nov 53

"Drooping of Cereal Plants Under the Effect of Respiratory Poisons," N. S. Turkova, G. R. Liepinya, Moscow State U

DAN SSSR, Vol 93, No 1, pp 183-184

Found that respiratory poisons (CO, H_2S) bring about drooping of cereal plants. Under the effect of H_2S the reductive capacity of the contents of stalks of oat plants dropped by 51.3%. Presented by Acad A. I. Oparin 7 Sep 53.

275T2

TERENT'YEVA, L.A., kand. med. nauk; LIYEPINYA, I.Ya. [Liepina, I.], kand. med. nauk

Scientific Conference Dedicated to the 125th Anniversary of the Kemeri Health Resort. Vop. kur., fizioter. i lech. fiz. kul't. 29 no.1.91-94 '64. (MIRA 17:9)

SVIRLOVSKIY, E.I. [deceased]; LIYEPINYA, M.P.; PILPE, L.D.

Anatomical structure of the leaves of Scopolia carniolica Jacq. Trudy Len. khim.-farm. inst. 12:71-73 '61. (MIRA 15:3)

1. Kafedra farmakognozii farmatsevticheskogo fakul'teta Rizhskogo meditsinskogo instituta.
(LATVIA—SCOPOLIA)
(LEAVES—ANATOMY)

5.5300

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SOV/75-15-1-1/29

AUTHORS: Bankovskiy, Yu. A., Iyevin'sh, A. F., Liyepinya, Z. E.

TITLE: Analytical Application of 8-Mercaptoquinoline (Thiooxine) and Its Derivatives. Communication 10. Relative Stability of Thiooxinates and the Influence of Complexing Agents on the Reaction of Thiooxine With Cations

PERIODICAL: Zhurnal analiticheskoy khimii, 1960, Vol 15, Nr 1, pp 4-9 (USSR)

ABSTRACT: A relative stability of thiooxinates of different elements and the relation between the thiooxinates and different complexing agents was studied. Parallel determinations of the relative stability of thiooxinates of different elements were made by three different methods: substitution, rate of thiooxinate formation, and the limits of thiooxinate extraction. It was found that the investigated thiooxinates form a following series, according to their stability:

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Re > Au > Ag > Hg > Pd > Pt > Ru > Os > Mo > Cu > W > Cd > In > Zn > Fe > Ir > V > Co > Ni > As > Sb > Sn > Bi > Pb > Mn > Tl.

This series is only approximate, since the methods used do not always give reproducible results. The corrections may be made after the dissociation constants of the thiooxinates are determined. Reaction between the thiooxinates and H_2S at different pH was studied in order to show that the stability of thiooxinates depends not only on the metal-sulfur bond, but also on the strength of the metal-nitrogen bond. The results are shown in Table 1. Experiments were conducted in order to compare the stability of oxinates and thiooxinates. It was found that in acid and alkaline media, the thiooxinates, which

Table 1. Reaction of H_2S with thiooxinates (a) thiooxinates; (b) product of reaction of thiooxinate with H_2S at different pH; (c) decomposes; (d) forms slowly; (e) partly decomposes; (*) decomposes to perrhenate; (**) decomposes to tungstate; (***) in an alkaline media in the presence of oxidizing agent, forms vanadate.

(a)	(b)		
	pH 1	pH 3	pH 10
Re	—	—	Na_2ReO_4 *
Au	—	—	—
Ag	Ag_2S	Ag_2S	Ag_2S
Hg	HgS	HgS	HgS
Pd	—	—	—
Pt	—	—	—
Ru	—	—	(e)
Os	—	—	—
Mo	—	—	—
Cu	—	—	—
W	—	—	Na_2WO_4 **

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Table 1 (cont'd)

(a)	(b)		
	pH 1	pH 3	pH 10
Cd	—	—	—
In	—	—	—
Zn	—	—	—
Fe	—	—	—
Ir	—	—	—
V	—	—	(c) ***
Co.	—	—	—
Ni	—	—	—
As	As_2S_3	(d) As_2S_3	Na_3AsO_3
Sb	Sb_2S_3	Sb_2S_3	Sb_2S_3
Pb	PbS	PbS	PbS
Sn	—	—	—
Bi	Bi_2S_3	Bi_2S_3	Bi_2S_3
Mn	(c)	(e)	—
Tl	Tl_2S	Tl_2S	Tl_2S
Ta	—	—	(c)
Nb	—	—	(c)

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Analytical Application of 8-Mercaptoquinoline (Thiooxine) and Its Derivatives. Communication 10. Relative Stability of Thiooxinates and the Influence of Complexing Agents on the Reaction of Thiooxine With Cations

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form hydrolyzable sulfides, are more stable than oxinates of the same elements, with the exception of vanadium (in acid solution) and Nb and Ta (in alkaline solution). Studying the effect of different substances on the reaction between different elements and thiooxine, the authors come to the conclusion that highly concentrated hydrochloric acid acts as a masking agent for the following elemements: Fe, Mo, Hg, Ag, Bi, Sn, and Sb; thiourea for: Cu, Ag, Au, Pt, Hg, Ru, and Os; sodium fluoride for Fe^{3+} and Sn^{4+}; potassium cyanide (in alkaline solution) for: Fe (II), Ag, Au, Pt, Ru, Os, Ir, Pd, Ni, and Co; Potassium thiocyanide is a good masking agent for Fe (III) and for moderate amounts of Zn and Cd. There are 2 tables; and 13 references, 4 German, 9 Soviet.

ASSOCIATION: Institute of Chemistry, Academy of Sciences, Latvian SSR, Riga (Institut khimii Akademii nauk Latviyskoy SSR, Riga)

SUBMITTED: March 18, 1958

Card 5/5

ZABRODKIN, A.G.; LIYEVA, V.Yu.; VASIL'YEV, M.L.

Synthesis of gluing materials from high-boiling shale-oil phenols. Khim. i tekh. gor. slan. i prod. ikh perer. no.9:236-241 '60. (MIRA 15:6)

(Glue) (Oil shales) (Phenols)

ZABRODKIN, A.G.; ZELENIN, N.I.; LIYEVA, V.Yu.; FEOLILOV, Ye.Ye.; VASIL'YEV, M.L.

Plane tests of synthetic adhesives on a base of shale phenols boiling at temperature up to 300°. Khim. i tekh. gor. slan. i prod. ikh perer. no.10:246-252 '62. (MIRA 17:5)

Plant tests of synthetic adhesives on a base of shale tar phenols combined with tricresol and boiled away at temperature above 300°. Ibid.:253-256

S/672/62/000/011/006/011
D403/D307

AUTHORS: Glushenkova, Ye. V., Zabrodkin, A. G., Liyeva, V. Yu. and Semenov, S. S.

TITLE: Adhesive resins from hydrogenation phenols

SOURCE: Leningrad. Vsesoyuznyy nauchno-issledovatel'skiy institut pererabotki i ispol'zovaniya topliva. Trudy. no. 11, 1962. Khimiya i tekhnologiya topliva i produktov yego pererabotki, 120-126

TEXT: The present work is an indirect continuation of earlier studies at TsNIIFM, together with Institut slantsev ESNKh (Shale Institute ESNKh)(Trudy In-ta slantsev ESNKh, no. 9, Gostoptekhizdat, 1960) and VNIIT (Trudy VNIIT, no. 9, Gostoptekhizdat, 1960); the investigation was directed at using the substances obtained by the hydrogenation purification of shale phenols as the raw material for the production of adhesive resins. Hydropurification phenols (I) and phenols obtained during the hydrogenation of generator tar residues above 325°C (II) were used to make the resins. The adhe-

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sives were tried on plywood and bakelite-treated plywood, at 140 - 150°C, and under 18 - 23 and 35 - 40 kg/cm^2 respectively. It was found that I and II resins may be used as adhesives with additions of 25% of tricresol by weight. In the absence of additives I and II resins may only serve as adhesives of the pressing times are increased by 50 - 100%. The adhesives are also improved by additions of 5.8 - 6.5% of resorcinol or technical dimethylresorcinol; such glues are suitable for bakelite-treated plywood. There are 7 tables.

GLUSHENKOVA, Ye.V.; LIYEVA, V.Yu.; SEMENOV, S.S.; ZABRODKIN, A.G.; GONCHAROV, V.I.; KALASHNIKOVA, Ye.B.

Adhesive resins from shale phenols of nonalkaline separation. (MIRA 18:11)
Trudy VNIIT no.12, 83-89 '63.

OMAROV, T.B.; PANOVA, G.V.; SYSHCHENKO, T.Ye.; FIRAGO, B.A.; SHCHEGOLEV, D.Ye.; LIYGANT, M.; SAVRUKHIN, A.P.

Results of photographic observations of artificial satellites. Biul.sta.opt.nabl.isk.sput.Zem. no.10:17-24 '59. (MIRA 13:3)

1. Astrofizicheskiy institut AN KazSSR (for Omarov). 2. Glavnaya astronomicheskaya (Pulkovskaya) observatoriya AN SSSR (for Panova, Syshchenko, Firago, Shchegolev). 3. Nachal'nik stantsii nablyudeniya iskusstvennykh sputnikov Zemli, Institut fiziki i geofiziki AN Tadzhikskoy SSR (for Savrukhin). 4. Nachal'nik stantsii Tartusskogo gosudarstvennogo universiteta (for Liygant).
(Artificial satellites--Tracking)

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S/033/60/037/006/019/022
E032/E514

6.1100
6.1210

AUTHORS: Liygant, M. and Eynasto, Ya.

TITLE: On the Theory of Automatic Satellite Tracking Telescopes

PERIODICAL: Astronomicheskiy zhurnal, 1960, Vol.37, No.6, pp. 1087-1095

TEXT: The problems connected with the design of automatic telescopes for satellite tracking are discussed. The first section is concerned with the various types of mcunting for satellite tracking telescopes using fixed and moveable polar axes. The second section is concerned with the equations describing the apparent motion of a satellite. Expressions are derived for the apparent coordinates of a satellite and the various corrections which have to be introduced in order to take into account the rotation of the Earth. In the third section it is pointed out that although all these expressions are relatively simple, they are not very conveniently interpreted either mechanically or electro-mechanically. They are thus unsuitable for programming purposes. One of the possible ways of simplifying these expressions is the replacement of the elliptical orbit by a circular orbit. It is

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On the Theory of Automatic Satellite Tracking Telescopes

shown that an acceptable accuracy can be achieved in this way. Automatic telescopes for satellite tracking using this approximation are being built at the Kiyevskiy gosudarstvennyy universitet (Kiyev State University) and the Institut fiziki i astronomii Akademii nauk EstSSR (Institute of Physics and Astronomy of the Academy of Sciences of the Estonian SSR). The programming device of the Kiyev telescope (Yakovkin, Ref.1) used this approximation, the error involved being of the order of 10 deg. Another automatic device has been developed by Tiyt (Ref.2). The programming device is a model of the motion of the satellite with a circular orbit. The principles of the programming device involved were put forward independently by G. G. Kuzmin, Ya. Eynasto and A. Sapar. In all these telescopes azimuthal mounting is employed. Sections 4 and 5 are concerned with further approximations to the actual satellite orbits and these are designated as the "small circle approximation" and the "great circle approximation", respectively. In the former case the polar axis of the telescope is directed to the pole of the

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E032/E514

On the Theory of Automatic Satellite Tracking Telescopes

apparent orbit of the satellite and this is achieved with the aid of a mounting incorporating two additional axes. The paper is concluded with a brief section on the photography of satellites. A telescope based on the small circle approximation was first discussed by G. G. Kuzmin, Ya. Eynasto and L. Sorgsepp in January, 1958. A telescope of this type was built by them at the Tartu State University. There are 9 figures, 1 table and 3 Soviet references.

ASSOCIATION: Tartuskiy gosudarstvennyy universitet Institut fiziki i astronomii Akademii nauk EstSSR
(Tartu State University, Institute of Physics and Astronomy, Academy of Sciences, EstSSR)

SUBMITTED: February 15, 1960

Card 3/3

LIYGANT, M. [Liigant, M.] (Tartu)

Approximation of the apparent motion of artificial earth satellites by a small circle. Biul.sta.opt.isk.sput.Zem. no.29:17-24 '62. (MIRA 16:2)

1. Tartusskiy gosudarstvennyy universitet.
(Artificial satellites--Tracking)

LIYGANT, M. [Liigant, M.] (Tartu); KAKHUSK, R. [Kahusk, R.] (Tartu)

Tracking camera for the observation of artificial earth satellites. Biul.sta.opt.nabl.isk.sput.Zem. no.29:25-29 '62. (MIRA 16:2)

1. Tartuskiy gosudarstvennyy universitet.
(Artificial satellites—Tracking)
(Astronomical photography—Equipment and supplies)

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ACC NR: AR6027535 SOURCE CODE: UR/0313/66/000/005/0030/0030

62
B

AUTHOR: Liygant, M.

TITLE: Equations for the apparent motion of artificial satellites of the Earth

SOURCE: Ref. zh. Issledovaniye kosmicheskogo prostranstva, Abs. 5.62.211

REF SOURCE: Soobshch. Tartusk. astrofiz. observ., no. 14, 1965, 35-46

TOPIC TAGS: artificial satellite, satellite, apparent motion, elliptic orbit, artificial satellite orbit

ABSTRACT: Equations are given for the apparent motion of a satellite in an arbitrary spherical coordinate system moving in a hypothetical Keplerian orbit. The possibility of approximating the elliptical orbit is discussed, the accuracy of the approximation is evaluated, and corrections for coordinates are given, taking into account the Earth' s rotation. Orig. art. has: 11 reference items. [FM]
[Translation of abstract]

SUB CODE: 03,01/

Card 1/1